

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) Publication number:

0 363 156 A3

(12)

EUROPEAN PATENT APPLICATION

(21) Application number: 89310117.0

(51) Int. Cl.⁵: **A61B 8/06**, G01B 17/00,
G01F 1/66

(22) Date of filing: 03.10.89

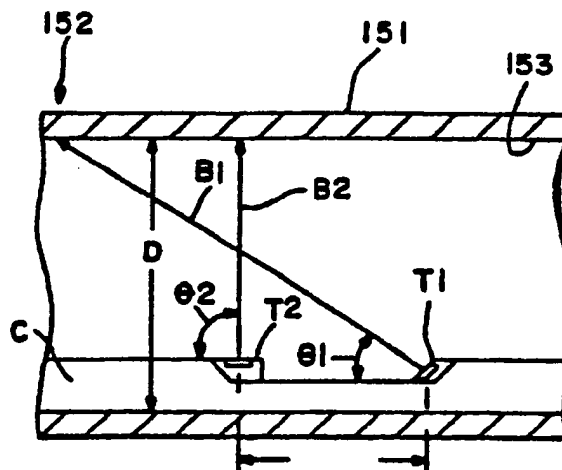
(30) Priority: 05.10.88 US 254317

(43) Date of publication of application:
11.04.90 Bulletin 90/15(84) Designated Contracting States:
DE FR(88) Date of deferred publication of the search report:
17.04.91 Bulletin 91/16(71) Applicant: **CARDIOMETRICS, INC.**
645 Clyde Avenue
Mountain View California 94043(US)(72) Inventor: **Nassi, Menahem**
602 Wellsbury Court

Palo Alto California 94306(US)
Inventor: **Williams, Ronald G.**
1313 Sherman Avenue
Menlo Park California 94025(US)
Inventor: **Segal, Jerome**
3025 Cowper Street
Palo Alto California 94306(US)
Inventor: **Corl, Paul D.**
3883 El Centro Street
Palo Alto California 94306(US)
Inventor: **Cowan, Mark William**
1766 Mandan Place
Fremont California 94539(US)

(74) Representative: **Wayte, Dennis Travers et al**
BOULT, WADE & TENNANT 27 Furnival Street
London, EC4A 1PQ(GB)(54) **Apparatus and method for measuring volumetric flow of a liquid.**

(57) Apparatus for measuring volumetric flow of a liquid in a vessel having a wall and having an axis extending longitudinally of the vessel parallel to the vessel wall comprises a flexible catheter (12) adapted to be disposed in the vessel. First and second ultrasonic transducers (T1, T2) are carried by the catheter on one side of the catheter and face the wall of the vessel so that the beams (B1, B2) from the transducers each cross the longitudinal axis of the vessel. The first transducer beam (B1) is inclined at an angle with respect to the longitudinal axis of the vessel. The second transducer beam (B2) is inclined in a direction which is generally perpendicular to the longitudinal axis of the vessel.

**FIG.— 3**



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 89 31 0117

| DOCUMENTS CONSIDERED TO BE RELEVANT | | | |
|--|--|--|--|
| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int. Cl. 5) |
| Y | IEEE TRANSACTIONS ON SONICS AND ULTRASONICS vol. SU-27, no. 6, November 1980, pages 277-286, New York, US; R.W. MARTIN et al.: "An Ultrasonic Catheter for Intravascular Measurement of Blood Flow: Technical Details" * abstract; page 277, left-hand column, line 1 - page 278, left-hand column, line 27; figure 1 * | 1,2,17 | A 61 B 8/06 G 01 B 17/00 G 01 F 1/66 |
| A | idem --- | 9 | |
| Y | EP-A-0 270 733 (APPLIED BIOMETRICS, INC.) * abstract; page 10, line 30 - page 16, line 28, Figures 1-6 * | 1,2,17 | |
| A | --- | 5,8,12 | |
| A | EP-A-0 234 951 (CARDIOVASCULAR IMAGING SYSTEMS) * abstract; page 10, line 25 - page 11, line 29; figure 8 * | 7 | |
| A | PATENT ABSTRACTS OF JAPAN vol. 10, no. 9 (P-420)(2066), 14 January 1986; & JP - A - 60166821 (YOKOKAWA HOKUSHIN DENKI K.K.) 30.08.1985 * abstract; figure * | 13,21 | A 61 B 8/00 G 01 B 17/00 G 01 F 1/00 |
| The present search report has been drawn up for all claims | | | |
| Place of search BERLIN | | Date of completion of the search 31-01-1991 | Examiner WEIHS J.A. |
| CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document | | | |